

The University of Chicago

CERTAIN EMOTIONAL FACTORS IN LEARNING AND EFFICIENCY

A DISSERTATION SUBMITTED TO THE
GRADUATE FACULTY IN CANDIDACY FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF PSYCHOLOGY

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CHICAGO, ILLINOIS

Offprinted from
THE JOURNAL OF GENERAL PSYCHOLOGY
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CERTAIN EMOTIONAL FACTORS IN LEARNING AND EFFICIENCY*¹

*From the Psychological Laboratory of the
University of Chicago*

FRED MCKINNEY

INTRODUCTION

Frequently, in learning experiments, investigators find subjects who seem quite disturbed emotionally, either because they are being timed and feel that they are not working rapidly enough, or because they fear that their self-recognized lack of ability in intellectual tasks is being displayed. In this experiment it was intended to produce artificially, in all subjects, such an emotionally disturbed condition as occurs under many experimental conditions where ability is being measured. By this procedure the effect of such a variable on learning and efficiency can be measured. No experimental work has been done to touch directly upon this problem; the closest approach is found in the following studies:

Myers (6) compared records of two groups of 13 girls in learning four five-word lists. One group was instructed to use all the time needed to learn correctly and to learn as quickly as possible; the other was given a 9-minute time limit which was sufficient for learning. The average for the first group was 14 minutes, 47 seconds. There was practically no difference in accuracy. Awareness of a time limit seems to improve output by increasing speed, but hardly to affect accuracy.

Bills and Brown (1), in a study on the "quantitative set," used a time set as well as an amount set. Under the time set, amount was controlled by always giving the subjects enough to keep them busy throughout the period. They were instructed to work as fast as possible, but no requirement was made as to the amount of work to be accomplished. The conditions involved 2-, 4-, 8-, and 16-min-

*Recommended for publication by Arthur G. Bills, accepted by Carl Murchison of the Editorial Board, and received in the Editorial Office, July 1, 1932.

¹The author is indebted to Dr. A. G. Bills for criticism and suggestions.

ute periods, and a signal was given at each quarter minute. Whereas a clear relationship was demonstrated between the initial level and decrement in the amount set, no such relationship appeared when time set alone was used. The decrements under the time set were equal for all four conditions.

Gilchrist (3) reports a 79% improvement on the Courtis English Test in the case of a group of 29 college students after praise, while 21 in a reprovved group deteriorated. In this second group, students doing well on the first test deteriorated while poor students improved. Gates and Rissland (2), using motor coordination and color-naming with 74 college students, found the rank order of improvement in the former test to be: (1) encouraged group; (2) discouraged; (3) repetition (the test being repeated in this group). In the latter test the groups took the order: (1) discouraged; (2) encouraged; (3) repetition. Hurlock (4) demonstrated that on the whole praise and reproof are of equal value as incentives. Using as her material a group intelligence test, she compared 408 students of different ages, sexes, races, and initial abilities in three groups: praised, reprovved, and control.

There have been numerous studies on the retention of affectively toned material. Meltzer (5) has reviewed these studies and has criticized them mainly on the grounds of unreliability and artificiality of conditions. Many investigators used too few subjects; some had unreliable questionnaires; some used conditions which were not at all true to life and, in most studies, it is doubtful whether or not a genuine emotion was induced in the subjects. None of these studies deals with an experimentally produced emotion.

Experiments [reviewed by Ruch (7) in his study of the same problem] have been conducted with intelligence tests in which the results on a test with a time limit have been compared with those on the same test with indefinite or doubled time. The correlations between a test with a time limit and the same with unlimited time are around .95. It must be remembered, however, that in such cases the subjects are told that they are not expected to complete all the items on the test, nor are they expected to have them all correct.

Precisely, the object of this experiment is to ascertain the effects of an unreasonable time limit and a suggestion of intellectual inferiority on learning and efficiency. It, therefore, differs from Myers'

set-up in that the subjects were given an unreasonable time limit; it differs from Bills' and Brown's in that both a time and an amount limit were simultaneously imposed. It differs from the intelligence-test time-limit studies in that subjects were told to perform until they had reached a criterion of perfection. Finally, it differs from the praise-and-blame experiments in many respects, especially in that it was given to individuals under carefully controlled laboratory conditions and not in classroom groups as many of the latter were given, in that a time factor was involved, and in that inferiority was inferred rather than stated.

METHODS, APPARATUS, AND SUBJECTS

The three *conditions* under which the subjects worked were as follows:

1. *Control*. The subjects were given the instructions concerning the task, nothing being said about time.

2. *First Experimental*. The subjects were given the same instruction with the additional information, "At the end of each minute an automatic clock will buzz." The only difference in the experimental conditions was the buzzing of this clock.

3. *Second Experimental*. In addition to the information concerning the periodic buzz the subjects were told by printed instructions: "You should not take over 6 minutes to master this task. This is sufficient time for a person of average intelligence. At the lapse of this period an interval timer will ring. Should it happen that you have not finished by then, go ahead until you have finished." This experimental condition differed from the second in that an interval timer was placed on the desk to ring at the end of 6 minutes.

The *tasks* consisted of:

1. *Motor Learning*. A Chicago stylus maze² was used. The subjects were given printed instructions explaining that retracing of the true path and entrances into blind alleys would be counted as errors. The two types of errors were recorded separately. They were told that two perfect consecutive runs were considered as mastery and that their styluses would be removed from the maze when they had reached the end. Retention was tested after 24 hours by relearning.

²A diagram of this maze will be found labeled as Maze B on page 22 in L. W. Webb's "Transfer of Training and Retroaction" (8).

2. *Ideational Learning.* A Hull automatic electric memory drum was used, giving a 2-second exposure. The list consisted of 12 nonsense syllables which were to be learned by the anticipation method, the syllables being spelled. The subjects were given typed instructions explaining what they were to do and explaining that the criterion for mastery was two perfect consecutive recitations. Retention was tested after 24 hours by relearning. And as in the maze learning, if the subject did not return at this time, his name was dropped from the relearning list.

3. *Motor Work.* A ruler-type steadiness tester was used with a small buzzer attached which would sound each time the subject made a contact. The subjects were instructed to move the stylus along the alley between the rulers to a certain point and back to the starting-point 50 times. They were told that whenever they made a contact they were to return to the starting-point and begin on another run, since all runs in which there were contacts would not be credited toward the 50 which they must complete. In addition, subjects were instructed as to how to hold the stylus and were given 5 errorless practice runs. The experimenter recorded the time for each run and all errors.

4. *Mental Work.* Twenty-five multiplication problems were given to the subjects. They consisted of three-place by three-place and four-place by four-place numbers. These were typed on cards, and the subject put the cards over his sheet of paper and did the actual multiplying on the blank sheets without copying the problem. The experimenter recorded the time taken to finish each problem, and also placed a mark with a colored pencil on the subject's paper at the end of each minute so that later the number of multiplications done per minute could be calculated.

In most cases the tasks were given on four successive days, the order of presentation being systematically varied in counterbalanced practice order, to correct any effect due to position of the task and also to ascertain whether the effect of the experimental conditions tended to change during the four days.

A one-way vision screen, permitting vision in only one direction and separating the subject and the experimenter, allowed the subject to be observed without being aware of it. This also prevented the subject from being influenced by the experimenter's behavior. Observations of the subject's facial expressions, movements, and verbalizations were made during the course of the experimentation.

The subjects were later told that they had been observed through the screen and none of them objected to this procedure.

The *subjects* were naïve as to the purpose of the experiment, and an attempt was made to choose subjects who were not accustomed to psychological laboratory situations. Data are available for 137 subjects divided equally among the three conditions. If some of the experimental sittings of a subject were ruined by accidental occurrences the data from them were discarded, but the other data from that subject were retained. Thus the number of subjects for each test under each condition varied from 40 by a small number. The majority of the subjects were the typical ones used in the Chicago laboratory, introductory students in psychology.

At the end of the four periods the subject was handed a card asking him to write what "went on in his mind" during the experimentation. No suggestions were given as to what he should answer. After he had done this he was given another card asking him specifically if anything distracted him, if he had any feelings of inferiority, disgust, etc. These papers were examined later and the frequency of the appearance of different statements was tabulated for the three conditions.

RESULTS

The data show the following facts:

1. In learning and work, *errors* show a significant increase from Condition 1 to 3 in all cases, and from Condition 1 to 2 in the case of the maze and multiplication (Table 1). Errors show a significant increase from Condition 2 to 3 in the case of multiplication. Errors show a consistent increase in all measures of those tests in comparing Conditions 1 and 2 and Conditions 2 and 3. The differences between the means divided by the standard errors, except for the significant differences mentioned above, range from .70 to 2.32. These facts seem to point quite conclusively to the generalization that errors increase rather markedly when a time factor is introduced and increase still more when a time limit and a suggestion of inferiority are introduced.

2. In no tests of learning and work was the increase or decrease in *time* statistically significant. In maze and multiplication tests the time increased from Condition 1 to 2 but decreased from Condition 2 to 3, becoming slightly less than that of Condition 1 in the case of multiplication. In only two cases out of six was there a decrease in

TABLE 1
MEANS AND RELIABILITY* MEASURES OF VARIOUS TESTS

Conditions	Means		Differences				Standard error of the difference				Difference	
	1	2	3	3-2	3-1	2-1	2-3	1-3	1-2	2-3	1-3	1-2
<i>Maze (learning)</i>												
Errors (culs)	53.02	120.40	135.69	15.29	82.67	67.38	21.65	17.73	18.71	.70	4.66†	3.60
Errors (retraces)	39.95	78.47	103.25	24.78	63.30	38.52	15.62	12.54	12.45	1.59	5.05†	3.09
Time (in sec.)	1189.84	1655.00	1552.40	—102.60	362.56	465.16	229.60	129.70	207.10	.45	1.82	2.24
Trials	24.76	27.35	31.60	4.25	6.84	2.59	4.00	3.83	4.71	1.06	1.79	.54
<i>Maze (relearning)</i>												
Errors (culs)	8.16	8.55	6.98	—1.57	—1.18	.39						
Errors (retraces)	2.83	3.83	4.74	.91	1.91	1.00						
Time (in sec.)	144.53	228.09	175.38	—52.71	30.85	83.56	49.45	39.87	48.34	1.06	.77	1.72
Trials	7.03	7.26	7.17	—0.09	.14	.23						
<i>Nonsense Syllables</i>												
Learning	47.83	43.52	53.97	10.45	6.14	—4.31	5.90	5.66	5.86	1.77	1.09	.73
Relearning	7.37	5.10	6.17	1.07	—1.20	—2.27	7.54		2.09			1.08
<i>Multiplication</i>												
Time	1414.25	1439.00	1327.12	—111.88	—87.13	24.75	89.81	73.94	81.95	1.24	1.18	.28
Errors	193.00	203.72	221.91	18.19	28.91	10.72	3.11	2.83	2.70			
<i>Steadiness</i>												
Time	592.10	510.31	648.63	138.32	56.53	—81.79	65.61	53.60	21.73	5.84†	10.21†	3.97†
Errors	36.73	43.52	76.59	33.07	39.86	6.79	14.25	14.14	6.46	2.21	1.06	3.70
										2.32	2.82	1.02

*Reliability was not calculated for those differences which seemed negligible.

†Statistically significant.

going from Condition 1 to the experimental conditions, and these cases occurred in the work tasks. For one of the increases in time the difference of the mean divided by the standard error of the mean was equal to 2.24, for another 2.21. These facts all seem to lead to the generalization that time may increase or decrease as the result of an introduction of a time factor into the experimental situation, but the tendency seems to be more in the direction of an increase. This is interesting in view of the fact that one would expect, on the basis of Myers' findings, that when a subject is made aware of the time element his time would decrease, time thus acting as a motivator. But apparently that is true only under some conditions and not when the limit is too short or when a clock is ringing each minute.

3. In the case of the maze, *trials* increased from Conditions 1 to 2 and from 2 to 3. In the case of nonsense syllables the trials decreased from Conditions 1 to 2 but increased from 2 to 3. None of these differences was statistically significant. This leads to the generalization that the number of trials required to learn is affected slightly by a time factor or a feeling of inferiority and more often in the direction of an increase. This slight influence of the experimental conditions seems true even of nonsense syllables where trials are the only measure of learning. However, it was noted after the experiment was under way that the time factor was present, even in the control condition with the use of the Hull drum, in that the subject had to anticipate the syllable in two seconds. Many subjects complained of this too-precise presentation which tended to "upset" them. Many claimed that they could say the syllables without the drum; could write them out, etc. Some went so far as to refuse to look at the drum but turned their heads and began reciting the syllables without the aid of it. They seriously objected to being forced to meet the condition.

4. None of the differences between mean *relearning* scores on different conditions was statistically significant. Seven out of eight measures in the case of the maze showed that relearning was deleteriously affected in the experimental conditions. The nonsense syllables showed somewhat better relearning scores under the experimental conditions, but the differences between the experimental and controlled conditions were not statistically significant; and in view of the objection given above little weight can be placed on these results.

5. With the exception of one case, the *sigmas* of the distribution

of scores showed a consistent increase under the experimental conditions.

6. The data were arranged to ascertain whether the amount of effect which was produced by the time factor would increase or decrease over the four-day period. The number of cases was necessarily small and the groups containing atypical individuals would influence the trends. However, it was thought that if the data showed any consistent trends, a basis might be established for formulating some generalizations. Examination showed that the only groups of measures which indicate a trend are the maze measures of Condition 1 and the measures of steadiness time. In these cases the tendency is for the scores to grow larger when the test is in any position except the first. In 13 out of 20 measures the last position has a higher cumulative score than the first. This might justify the generalization that the effect of the time limit and feeling of inferiority have a slight tendency to increase over the four periods.

7. Table 2, which gives a tabulation of statements gathered from the *introspective reports*, shows marked differences between the three conditions. Most of the statements were found in all three conditions, but their frequency tends to increase in the second and third conditions progressively. The increase did not show itself in statements of dislike for the tasks. More people under Condition 1 expressed dislike for the task than under the experimental conditions. In the experimental conditions their introspective reports were filled

TABLE 2
FREQUENCY OF SUBJECTS' STATEMENTS CONCERNING THEIR ATTITUDE
Number of persons expressing following attitudes

Conditions:	1	2	3
Temporarily inefficient	6	8	15
Distracting environment	10	14	19
Nature of tests		3	8
Fear			5
Dislike	8	1	3
Inferiority	6	4	16
Disgust		9	5
Distracting ideas		1	4
Other rationalizations			2
Absurdity of tests		6	3
Total	30	46	80

TABLE 3
BEHAVIOR NOTED DURING EXPERIMENTATION TABULATED IN ORDER OF
FREQUENCY

1.	Restlessness
2.	Statements of inferiority feelings
3.	Statements concerning time limit
4.	Swearing
5.	Laughing
6.	Desire to quit
7.	Tremor
8.	Weakening of voice
9.	Deep sigh
10.	Statements of temporary inefficiency
11.	Statements of hope of improvement

with statements offering excuses for their apparent lack of ability rather than expressing their boredom due to the tests. Statements of inferiority appeared most frequently, as one would expect, under Condition 3.

8. In Table 3 some of the behavior patterns exhibited are listed in order of their frequency of appearance. Such behavior appeared during both conditions but with greater frequency under the experimental conditions. Because of the necessity of taking records on the different tasks, the experimenter was unable to get an exact numerical estimate of the frequency of appearance of this behavior. From the results discussed above, the generalization can be drawn that marked differences appear in the subject's expressed attitude when a time factor alone is introduced, and that even greater differences appear when both a time limit and a suggestion of intellectual inferiority are present.

9. In order to make a more *analytical* study of those conditions in which a time limit and a suggestion of intellectual inferiority were introduced, Condition 2 was used as the control and Condition 3 as the experimental condition. Graphs were plotted of trials and errors per minute under the two conditions for the maze, steadiness test, and multiplication problems. These graphs (Figure 1) should show any influence which was exerted by the 6-minute time limit on any particular part of the learning or work period.

The average number of *trials* per minute in the maze was consistently higher in Condition 3 than in Condition 2. The curve for Condition 2 also is less irregular than that for the experimental conditions. The curve has the typical shape and is not presented here.

This allows the generalization that the subject requires more trials per minute throughout the entire maze-learning process when he is given a time limit and a suggestion that he is intellectually inferior.

The *work curve* for multiplication (Figure 1) has a higher initial spurt under Condition 3, but falls rapidly and remains below that of Condition 2 for 14 minutes. Then the curves become nearly identical. The generalization that may be drawn from this is that, in multiplication, subjects working under a time limit and given a suggestion of inferiority start at a higher initial level, but their output rapidly falls below that of the control group; after the task is half completed, the groups tend to become identical in production per time unit. This relates the phenomena here discussed to the quantitative set demonstrated by Bills and Brown (1), the subjects seeming to prepare themselves for the increased demand under the experimental conditions.

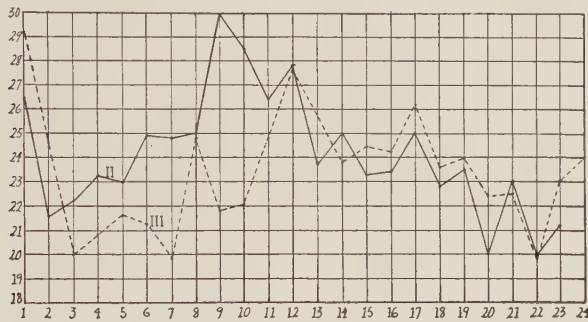
The work curves plotted from the data of the steadiness test are rather typical, showing a warming-up and decrement. The two curves have the same shape, and show the same tendency found in learning curves, that of Condition 3 being consistently higher than Condition 2, and are thus not included here.

The *error curves* all are consistently higher under Condition 3. The error curve for the multiplication (Figure 1) under Condition 3 shows a lower initial point with a subsequent higher point than the curve of the control condition. In addition to this peculiarity the curve rises several times during the duration of the task; in fact, it shows no clear tendency in the direction of a decrement. It is worth noting here that the multiplication task turned out to be a practice situation rather than a work situation. The errors were greater in the beginning than later. The curve (Figure 1) showing errors per minute in the maze again brings out the general tendency of increased errors under the experimental condition. This leads to the generalization that the elimination of errors is retarded under a time limit and a suggestion of intellectual inferiority. For the two work tasks the errors show a general tendency to increase as the task progresses.

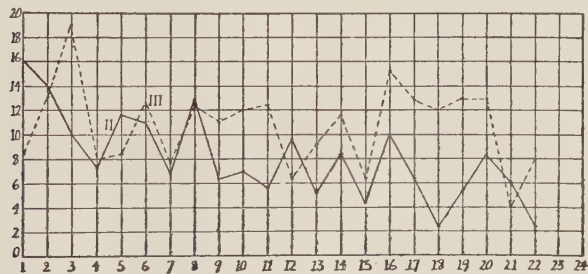
DISCUSSION

Judging from the behavior and general attitude of the subjects there is little doubt of the fact that a genuine emotion was induced in most of them under the experimental conditions. This emotional

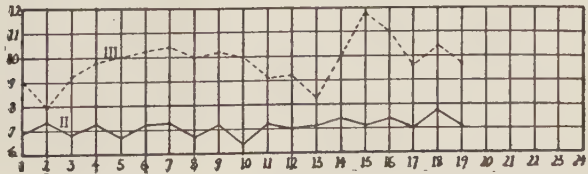
condition definitely affected the learning process as can be seen in the gross scores and the error curves. In the multiplication (Figure 1) the error curve for the control condition shows a steady drop, whereas the curve for the experimental condition does not show a tendency to drop. In fact, it hardly resembles a learning curve at all. It has an initial rise instead of an initial fall and rises again several times during the learning process. This seems to indicate that the initial fall in the curve may be partially due to an emotional condition which the individual overcomes.



Average number of multiplications per minute—Conditions II and III



Average error in multiplication per minute—Conditions II and III



Average error in maze per minute—Conditions II and III

FIGURE 1

In seeking an explanation for the effect which emotion has upon learning it might be well to remember that the physiological concomitants of emotion prepare the organism for overt behavior and not for ideational activity. The individual is energized and is impulsive; he finds it more difficult to represent his activity ideationally than to make the muscular response which vital processes prepare him to execute. In the light of this consideration, it is not surprising that we find so many more errors in the records of the subjects under the emotional condition. Even errors in the middle of the learning process might be expected. For example, in the maze, in addition to the correct responses which have been fixated, the subject often makes a number of extra random movements which are recorded as errors.

Some authors have considered the emotions important motives. Emotions may serve as great sources of motivation for action, but strong emotions can hardly be regarded as directors for problems which require deliberate activity. It is conceivable that as long as the emotion is just a mild but persistent stimulus it may act as a director or energizing force for ideational activity, but as soon as an emotion becomes so strong that impulsive behavior is unavoidable it retards rather than directs activity. The fact that "the after-effects of a connection" strengthen or weaken that connection or that an act is selected if it is successful has been well established and is known as the law of effect. However, it seems, in the light of the data here presented, that in addition to the after-effects of operation of a given specific connection, the effects or consequences of the whole learning situation are related to the fixation of correct responses and the elimination of errors. In this experiment many of the subjects maintained an unpleasant feeling as well as an attitude of inferiority and failure during almost the entire task. This was an effect of the set and the whole situation. The subjects realized that they were failing and this retarded learning. It therefore seems that in addition to the influence of the consequence of a specific connection on the fixation of that connection there is also the influence of the effect of the entire situation on the connections.³ How this effect operates is a matter of speculation at present. It is certainly true that if the subject maintains an attitude of failure or has an affective experience

³Dr. John A. McGeoch suggested that this may be considered another aspect of the law of effect.

during the entire task, this is associated with each specific act in that it is a part of the sensory situation. How these associations retard learning is a matter for future investigation. It may be that the emotional condition and its concomitants fully account for the effect on the learning situation; or it may be that the emotional situation accounts for only a part of the retardation.

Concerning the method in general, it seems that this experimental situation should prove a good one for the study of individual differences in personality and behavior in problem situations as well as a method for the study of emotional expression of individuals. By subjecting individuals to a standardized task as given here and recording their incidental behavior, it is possible that personality differences, overt and covert, in response to a problem situation would be evinced. It was noted that some subjects when asked to give an introspective report offered few or no rationalizations concerning their behavior during the tests, whereas others wrote pages. Some had relatively little to say during the tasks while others ceaselessly talked about the distracting environment or their temporary inefficiency. Still others laughed and belittled the tests. Quite a few swore, some apologizing, others not. The finding which seemed most interesting was that the subjects seemed to be off their guard concerning this incidental behavior because of the trouble they were having with the tasks and because of the pressure under which they were laboring.

Concerning emotional expression it might be noted that the experimenter has two means of measuring emotion by this technique: one by the number of errors which the subject makes in this task in excess of a control condition, and another by the number of movements and verbalizations which occur during the course of the task. As pointed out in describing the apparatus, a one-way vision screen was used in this experiment in order to note differences in movement frequencies under the two conditions. It was not possible to make records on both this and the tests, but a qualitative difference was noted under the experimental and control conditions. The work might be carried further to determine whether this method will serve as a means of measuring the behavior concomitants of a subjectively disturbed condition. Such a disturbance was reported by most subjects, and also expressed itself in their unsteadiness as shown by their scores.

This experimentation also raises a question concerning the valid-

ity of measuring intellectual abilities by the time-limit method, which is likely to introduce an emotional factor in some individual cases, invalidating the results.

The third condition of this experiment might be called an implicit "blame" condition which, in the light of past experiments, ought to produce better results than a control condition. Apparently the other complicating factors, such as a time limit and a rather strong emotional condition, tend to counteract any motivating effect of the conditions.

CONCLUSIONS

1. The introduction of a clock ringing periodically causes a consistent increase in errors in maze learning, multiplication, and motor coordination over the control condition, throughout the tasks. Time and trials are slightly affected in both directions, but more often in the direction of an increase.

2. The addition of a time limit and a suggestion of inferiority cause a still greater increase in these measures.

3. There is a slight indication that the effect of the experimental conditions becomes greater over the four days for some tasks.

4. There is a slight indication that retention is less under the experimental conditions.

5. The experimental conditions caused a measurable difference in the expressed attitude of the subjects, as well as a change in social behavior and an unsteadiness of movement.

SUMMARY

One hundred thirty-five subjects, divided into three groups, learned a maze and a list of 12 nonsense syllables, performed a motor task, and solved a group of multiplication problems. While one group went through these tasks an automatic clock buzzed each minute. In another group, in addition to the above set-up, the subjects were told that the average person could do the task in six minutes and at the end of that time an automatic interval timer rang. The third group worked under normal laboratory conditions. Errors in the task increased greatly with the introduction of the clock ringing each minute and increased more with the suggestion of intellectual inferiority. Time and trials were affected in both directions but tended to increase. There was a noticeable change in the expressed attitude of the subjects as well as a change in social behavior and steady-

ness of movement due to the experimental conditions. If there was any change in the effect of the conditions over the four days it was in the direction of an increase. The experimental results evince that emotion affects learning and that a strong emotion cannot act as a motive in an intellectual task or a skill. There seems evidence for another aspect of the law of effect in terms of the effect of the consequences of the whole learning situation on the fixation of specific acts. The set-up suggests a method of measuring emotion and of studying personality under a problem situation. Timing the subject and blame do not always act as motivators.

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CERTAINS FACTEURS ÉMOTIFS DANS L'APPRENTISSAGE ET
L' EFFICIENCE

(Résumé)

Cent trente-cinq sujets divisés en trois groupes ont appris un labyrinthe et une liste de 12 syllabes non-sens, ont fait une tâche motrice et ont résolu un groupe de problèmes de multiplication. Pendant qu'un groupe a accompli ces tâches, une horloge automatique a sonné chaque minute. Dans un autre groupe, outre l'arrangement décrit ci-dessus, on a dit aux sujets qu'une personne moyenne pourrait faire la tâche dans six minutes et à la fin de cette durée un appareil automatique d'enregistrement des intervalles a sonné. Le troisième groupe a travaillé dans des conditions normales du laboratoire. Les erreurs dans la tâche sont devenues beaucoup plus nombreuses avec l'introduction de l'horloge qui sonne chaque minute et sont devenues plus nombreuses avec la suggestion d'une infériorité in-

tellectuelle. Le temps et les épreuves ont été influencés dans les deux directions mais ont tendu à s'accroître. L'attitude exprimée des sujets a changé d'une manière marquée, ainsi que le comportement social et la fermeté du mouvement, ce qui a été dû aux conditions expérimentales. S'il y a eu un changement de l'effet des conditions dans les quatre jours, il a été dans la direction d'un accroissement. Les résultats expérimentaux montrent que l'émotion influe sur l'apprentissage et qu'une émotion forte ne peut agir comme mobile dans une tâche intellectuelle ou habileté. Il semble exister des témoignages d'un autre aspect de la loi de l'effet en termes de l'effet des conséquences de la situation entière sur la fixation des actes spécifiques. L'expérience suggère une méthode de mesurer l'émotion et d'étudier la personnalité dans une situation de problèmes. L'enregistrement du temps mis par le sujet et le blâme n'agissent pas toujours comme mobiles.

McKINNEY

GEWISSE AFFEKTIVE EINWIRKUNGEN AUF LERNEN UND LEISTUNGSFÄHIGKEIT

(Referat)

Es wurden 135 Versuchspersonen in drei Gruppen gesondert. Alle 135 lernten ein Labyrinth durchforschen, lernten eine aus 12 sinnlosen Silben bestehende Liste, führten eine motorische Aufgabe aus, und lösten eine Gruppe von Multiplizierungsaufgaben. Während eine der Gruppen diese Aufgaben ausführte, machte eine automatische Uhr jede Minute einmal einen summenden Laut. In einer anderen Gruppe bestanden die selben Verhältnisse, und es wurde ferner den Versuchspersonen gesagt, dass die durchschnittliche Vp. die Aufgabe in 6 Minuten erledigen konnte; am Ende dieser Zeit klang ein automatisches Zeitintervallenregistrierungsapparat [automatic interval timer]. Die dritte Gruppe arbeitete unter normalen Laboratoriumsverhältnissen. Die Fehlerzahl bei der Aufgabe nahm stark zu, wenn man die Uhr jede Minute schlagen lies, und noch stärker, wenn man die Idee der intellektuellen Unzulänglichkeit der Vp. suggerierte. Zeitverwand und Zahl der Versuche zeigten Abweichungen nach beiden Richtungen hin, neigten aber nach der Richtung der Vermehrung. Es zeigte sich eine merkbare Änderung in der geäußerten Einstellung der Vpp. und auch eine Änderung des sozialen Benehmens und in der Festigkeit der Bewegung unter Einwirkung der experimentellen Bedingungen. Wenn eine Änderung in der Einwirkung der experimentellen Verhältnisse im Laufe der vier Tagen überhaupt stattfand, so lag diese Änderung in der Richtung einer Zunahme. Die experimentellen Befunde weisen darauf hin, dass der Gemütszustand [emotion] das Lernen beeinflusst, und dass eine starke Gemütsbewegung bei einer intellektuellen Aufgab oder Tüchtigkeit [skill] nicht als Antrieb dienen kann. Es scheint Beweis vorzuliegen für das Bestehen einer anderen Seite des Einwirkungsgesetzes [law of effect] aus drückbar als Einwirkung der Folgen der Gesamtsituation auf die Fixierung spezifischer Tätigkeiten. Die experimentelle Einrichtung weist auf eine Methode zur Messung der Gemütsbewegung und zur Untersuchung der Persönlichkeit in einer Aufgabensituation hin. Die Bestimmung des Zeitverwandtes der Vp. [timing] und Tadel wirken nicht immer anspornend.

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